WHAT IS CLAIMED IS:

1. A detection device comprising:

(a) at least one set of waveguides, wherein each set comprises at least two waveguides;

(b) at least one metallic film, wherein each of the metallic films covers at least a portion of each of the waveguides and supports a surface plasmon wave; and

(c) ligand layers contacting the metallic films for binding analytes on the metallic films.

2. The detection device of claim 1, wherein the detection device comprises waveguides in optical fibers.

3. The detection device of claim 1, wherein the detection device comprises waveguides on a substrate, wherein the substrate comprises a first material having a surface, wherein the surface is covered by a second material having an index of refraction lower than the index of refraction of the first material.

4. The detection device of claim 3, wherein the first material comprises an optically transparent substance.

5. The detection device of claim 3, wherein the first material is borosilicate, silicon dioxide, or a polymer.

6. The detection device of claim 3, wherein the second material is magnesium fluoride.

7. The detection device of claim 1, wherein the metallic film comprises gold or silver.

8. The detection device of claim 1, wherein the metallic film covers the entire length of the waveguides.

9. A detection device comprising:

(a) at least one set of waveguides, wherein each set comprises at least two waveguides, and wherein each of the waveguides in the set has a distinct light propagation velocity; and

(b) at least one metallic film, wherein each of the metallic films covers at least a portion of each of the waveguides and supports a surface plasmon wave.

10. The detection device of claim 9, wherein the detection device comprises waveguides in optical fibers.

11. The detection device of claim 9, wherein the detection device comprises waveguides on a substrate, wherein the substrate comprises a first material having a surface, wherein the surface is covered by a second material having an index of refraction lower than the index of refraction of the first material.

12. The detection device of claim 11, wherein the first material comprises an optically transparent substance.

13. The detection device of claim 11, wherein the first material is borosilicate, silicon dioxide or a polymer.

14. The detection device of claim 11, wherein the second material is magnesium fluoride.

15. The detection device of claim 11, wherein each waveguide in a set of waveguides is covered by a distinct thickness of the second material.

16. The detection device of claim 9, wherein the waveguides within a set of waveguides each have a distinct size or shape.

17. The detection device of claim 9, wherein the metallic film comprises gold or silver.

18. The detection device of claim 9, wherein the at least one metallic film covers the entire length of the waveguides.

19. A method of detecting a shift of a surface plasmon resonance curve, the method comprising:

(a) transmitting a plurality of light beams through at least one waveguide on a detection device, wherein the detection device comprises

at least one metallic film, wherein each of the metallic films covers at least a portion of each of the waveguides and supports a surface plasmon wave;

(b) measuring the intensity of a plurality of light beams transmitted through the waveguides;

(c) computing a difference between the measured intensity of any two of the beams, wherein the light beams in the pair each have a distinct light propagation velocity within the waveguides, to provide a first calculated difference for the two beams at a first time;

(d) providing at least one sample to the metallic film;

(e) computing a difference between the intensity of the two light beams to provide a second calculated difference for the two beams at a second time; and

(f) comparing the first calculated difference to the second calculated difference, wherein a difference between the first calculated difference and the second calculated difference indicates a shift of the surface plasmon resonance curve.

20. The method of claim 19, wherein the detection device further comprises ligand layers for binding analytes on the metallic films.

21. The method of claim 20, further comprising providing an alternating polarity electric field to the sample, wherein the electric field has a field strength less than a binding strength between a ligand in the ligand layer and an analyte.

22. The method of claim 20, further comprising providing an alternating polarity electric field to the sample having a cycle, wherein the polarity during a first portion of the cycle is opposite to the polarity during a second portion of the cycle, and wherein the electric field has a greater strength during the first portion of the cycle that causes binding of the analytes than the strength during the second portion of the cycle that causes unbinding of the analytes.

23. The method of claim 19, wherein the light beams comprise different wavelengths.

24. The method of claim 19, wherein two light beams are transmitted through the same waveguide.

25. The method of claim 19, wherein the two light beams are transmitted through two waveguides, each having a distinct light propagation velocity.

26. The method of claim 19, wherein the two light beams are transmitted through two waveguides, each having a distinct shape or size.

27. The method of claim 19, wherein the detection device comprises waveguides on a substrate, wherein the substrate comprises a first material having a surface, wherein the surface is covered by a second material having an index of refraction lower than the index of refraction of the first material.

28. The method of claim 27, wherein the two light beams are transmitted through two waveguides, each covered by a distinct thickness of the second material.

29. The method of claim 19, further comprising repeating steps e) and f) continuously or at intervals.

30. A detection system, comprising:

(a) a cell directing at least one sample to a metallic film that supports a surface plasmon wave and covers at least a portion of at least one waveguide;

(b) a light source that transmits light beams into the waveguides;

(c) a detector to convert the transmitted light into an electrical signal;

(d) a processor that performs the steps of

converting the electrical signals into measured intensities;

computing a first calculated difference between measured intensities for two light beams at a first time, wherein the two light beams each have a distinct light propagation velocity within the waveguides;

computing a second calculated difference between measured intensities for the two light beams at a second time later than the first time; and

comparing the first calculated difference to the second calculated difference, wherein a difference between the first calculated difference and the second calculated difference indicates a shift of the surface plasmon resonance curve.

31. The system of claim 30, wherein ligand layers for binding analytes are attached to the metallic films.

32. The system of claim 31, further comprising:

(e) a voltage source connected through wires to physically separated conductive pads within the cell to provide an electric field across a separation, wherein the electric field has a field strength less than a binding energy between a ligand in the ligand layer and an analyte.

33. The system of claim 31, further comprising:

(e) a voltage source connected through wires to physically separated conductive pads within the cell to provide an alternating polarity electric field across a separation, wherein the electric field has a cycle, wherein the polarity during a first portion of the cycle is opposite to the polarity during a second portion of the cycle, and wherein the electric field has a greater strength during the first portion of the cycle that causes binding of the analytes than the strength during the second portion of the cycle that causes unbinding of the analytes.

34. The system of claim 32 or 33, wherein the conductive pads comprise the metallic film.

35. The system of claim 30, wherein the light source is a laser or light emitting diode.

36. The system of claim 30, wherein the light source is a semiconductor laser.

37. The system of claim 30, wherein the detector is a photodetector or charge-coupled device.

38. The system of claim 30, wherein the two light beams comprise light beams having different wavelengths.

39. The system of claim 30, wherein the two light beams are transmitted through the same waveguide.

40. The system of claim 30, wherein the two light beams are transmitted through two waveguides, each having a distinct light propagation velocity.

41. The system of claim 30, wherein the two light beams are transmitted through two waveguides, each having a distinct shape or size.

42. The system of claim 30, wherein the cell includes one or more conduits to flow the sample over the ligand layers.

43. The system of claim 30, wherein the processor continuously or at intervals repeats the steps of

computing a second calculated difference between measured intensities for the two light beams at a second time later than the first time; and

comparing the first calculated difference to the second calculated difference, wherein a difference between the first calculated difference and the second calculated difference indicates a shift of the surface plasmon resonance curve.

44. The system of claim 30, wherein the electrical signals are digital signals.

45. The system of claim 30, wherein the processor comprises a differential amplifier, or a handheld, mobile, personal, or mainframe computer.

46. The system of claim 30, wherein the difference between the first calculated difference and the second calculated difference is provided by satellite, radiofrequency broadcast, fiber optic cable, or electric wire to a location physically separated from the light sources and detectors.